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(54) 【考案の名称】 扇形表示輪列の修正機構

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(57) 【実用新案登録請求の範囲】

【請求項1】 ステップモーターを正逆回転させて指針により扇形表示を行なうための指針車と、指針車を駆動するローターと、ローターの回転を指針車に伝える減速輪列を有する指針扇形表示式電子時計において、前記指針車から前記ローター間の減速輪列中に設けられた被規制部材と、外部操作部材に連動するとともに、前記被規制部材の動作を規制する回転規制部材とを有しており、前記被規制部材が前記回転規制部材に当接して前記ローターが動作不能状態の時には、前記外部操作部材の操作により前記回転規制部材を、前記ローターの正回転動作にともなう前記被規制部材の動作方向側にずらすことにより、前記ローターを逆回転不可能状態から脱出可能に構成したことを特徴とする扇形表示輪列の修正機構。

【考案の詳細な説明】

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【0001】

【産業上の利用分野】 本考案は指針扇形表示時計のステップモーターを逆回転不可能状態から脱出させるための輪列修正機構に関するものである。

【0002】

【従来の技術】 近年、電子時計は多面的な市場ニーズに合わせて多種多様な商品が出始めており、デジタル時計はもとより指針表示式時計においても時計の多様化の要求が強く、クロノグラフや多針表示式カレンダーや月齢表示を付加したものなどが市場に出廻っている。さらに、斬新なデザインの電子時計として、ステップモーターを正逆回転させ曜針を扇形駆動させて表示する電子時計も出現している。

【0003】 ところで電子時計の場合、ステップモーターを逆回転駆動させるためには特殊のパルス印加する

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ようになっている。すなわち、1パルス逆回転させるには、最初に正転用のパルスを印加してローターを正転側に振ってから逆転用のパルスを印加するように構成されているものである。しかも、ステップモーターの正逆回転を用いて扇形表示をさせようとするときは、回転部材の途中に必ずストッパーを設けている。従って、曜を修正するような場合には、このストッパーに突き当たった場合でも確実に駆動することが必須である。しかし、ストッパーに突き当たってローターを停止させた場合、ローターの停止位置によってはストッパーがローターの正転方向の回転を阻止し、逆回転不可能状態に陥ることがある。

【0004】このような前記曜の扇形表示電子時計の輪列修正機構に関しては、本出願人より出願されている実開平3-8789号公報によれば、ステップモーターを逆回転不可能状態から脱出させるために、ステップモーターのローターから扇形表示部の指針車までの減速輪列のいずれかに回転用部材を設け、外部操作部材と連動する修正部材でステップモーターが正転から逆回転に回転変更する方向に回転用部材を押して逆回転不可能状態から脱出させ回動できるようにしている。

【0005】

【考案が解決しようとする課題】しかしながら、以上述べた従来例によれば、ステップモーターを逆回転不可能状態から脱出させるために、修正部材をステップモーターが逆回転する方向に動かさなければならない。すなわち修正部材を回転用部材が正常に動作している側に動かさなければならないので、修正部材が回転用部材の正常な作動範囲内に入る可能性が有る。従って指針が正常な動作をしている時にでも外部操作部材が押されると指針を動かしてしまう恐れがある。特に、同軸に二針を設け扇形表示するような電子時計においては、修正部材で回転させる方法では修正部材を二つ必要とするというような複雑な構造となる。

【0006】本考案の目的は、ステップモーターを逆回転不可能状態から脱出させる操作以外では、指針の位置に影響を与えることのない、簡単な修正機構を提供するものである。

【0007】

【課題を解決するための手段】上記の目的を達成させるために、本考案は次のような構成としている。すなわち、この考案に係わる扇形表示輪列の修正機構は、指針を取り付ける指針車と、ステップモーターと前記指針車との間に介在する減速輪列の一部には、前記ステップモーターの駆動の規制を与える回転規制用凸部を設け、さらに、前記ステップモーターが正回転で駆動し続けたときに前記ステップモーターの回転規制をする回転規制部材を備えていて、該回転規制部材は、外部操作により、外部操作部材と連動してステップモーターが正転する側に回転し、ステップモーターを正転から逆転方向に回転

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変更できるようにしている。

【0008】

【作用】以上の構成によれば、指針車が正常に動作をしている時に外部操作部材で操作を行なっても、指針車には何の影響もなく、指針の位置を変えてしまうこともない。

【0009】

【実施例】以下に本考案の実施例を図面に基づいて説明する。図1は本考案の実施例による指針扇形表示輪列修正機構を示す要部平面図で、裏蓋側から見たものである、図2は本実施例を適用した時計で、例えば電波を受信して時刻を合わせることでできる時計の外観図、図3は指針扇形表示輪列の断面図である。

【0010】図2において、1は12時間で1回転する時計針、2は60分間で1回転する分針、3は1秒運針で60秒間で1回転する秒針、4は24時間で1回転する24時間針であり、これらはいずれも通常時刻を表示し、ステップモーター（図示せず）により指針輪列を介して駆動する。

【0011】さらに、月針5と日針6でカレンダーを扇形表示する。該月針5はICからの電氣的制御により6ステップ/1月の運針で反時計方向に72ステップ歩進した後、月ステップモーターの早送りで72ステップ分（12月分）時計回転方向に戻る往復運針を行なう。また、日針6もICからの電氣的制御により2ステップ/1日の運針で反時計方向に62ステップ歩進した後、日ステップモーターの早送りで62ステップ分（31日分）時計回転方向に戻る往復運針を行なう。尚、月針5と日針6は、全回転させると文字板の上面に配設した電波を受信する為のアンテナ7やモード針8と平面的に重なってしまうので回転規制を必要とする。

【0012】8はモード針であり、9はモードを変えたり時刻を修正するため修正状態へ移行する等の信号をICに送るためのプッシュボタンであり（以下PB1と略す）、10、11、12、13はプッシュボタン2、3、4、5であり（以下各々PB2、PB3、PB4、PB5と略す）、それぞれにICに電気信号を送る部材が備えられている（図示せず）。

【0013】次に、図1と図3により月針5と日針6の扇形表示輪列機構と修正機構について説明する。まず、輪列機構について説明する。14はIC34からの電氣制御により月針5を扇形表示駆動させる月ステップモーター、15は月コイル16、月ヨーク17と共に月ステップモーター14を構成する月ローター、該月ローター15は時計基台である地板18と輪列受19に固定された貴石により軸支されている。また、地板18の上面側には月ヨーク17、月コイル16が積層配置されている。月針5を取り付ける月車20は減速輪列である月中間車（1）21、（2）22を介して月ローター15より駆動力が伝わる。該月中間車（1）21は裏板37と輪列

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受19に固定された貴石により軸支されていて、月中間車(2)22は月ローター15と同様に、地板18と輪列受19に固定された貴石により軸支されている。月車20は月針5を取り付ける月車真20aと回転力を受ける合成樹脂より成る月歯車20bとから構成されていて、月歯車20bには地板18に明けた異形の長穴18aと断面的に重なり、月車20を回転規制するときのストッパーとなる回転規制用凸部20cが一体成形されている。

【0014】日針6側の輪列機構も月針5側の輪列機構と同様の構成を成していて、23は日ステップモーター、24は日ローター、25は日コイル、26は日ヨーク、27は日車で27aは日車真、27bは日歯車である。また、28は日中間車(1)、29は日中間車

(2)であり、日歯車27bには月歯車20bと同様に回転規制用凸部27cが一体成形されている。

【0015】月歯車20bの回転規制用凸部20cと日歯車27の回転規制用凸部27cは、電池投入直後に行なうIC34との位置合わせ操作により、他部品と当接することなく地板18の異形の長穴18a内を往復運動するようになっている。

【0016】また、地板18の上面で輪列とは平面的に重ならない位置に回転規制部材30を配置している。ステップモーターの正転側の回転規制は、月歯車20b及び日歯車27bの回転規制用凸部20cと27cを該回転規制部材30の回転規制部30aに当てて行なっている。この時、回転規制部材30の平面的な位置規制は、地板18に植設された支柱36と回転規制部材30のパネ部30cの反力で行なっている。本実施例の場合のステップモーターの正転とは、月ローター15及び日ローター24が反時計方向に回転することである。一方、ステップモーターの逆回転側の回転規制は、月歯車20b及び日歯車27bの回転規制用凸部20cと27cを地板の異形の長穴の18aの端部18b側に当てて行なっている。従って、月針5と日針6はIC34が暴走してもアンテナ7に当たることもない。また、IC34と回転規制部材30の断面関係は、地板18の上面に回転規制部材30が配置され、その上に該回転規制部材30が摺動するために必要なスキを設けてある合成樹脂でできた回路支持台38が配置され、さらにその上方に回路基

【0017】次に、修正機構の動作について説明する。ICが暴走し、ステップモーターが正転し続け、月車20及び日車27の回転規制用凸部20cあるいは27cが回転規制部材の回転規制部30aにぶつかり停止し、逆回転不可能状態になったとする。このように逆回転不可能状態になるのはIC34が正常に動作していないためなので、IC34を初期化する必要がある、その操作として本時計は、(PB1)9を引き(PB2)10、

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(PB3)11、(PB4)12、(PB5)13を同時に押すようにしている。該操作でIC34からの電気信号により月ローター15と日ローター24を逆回転させ初期位置に駆動させるようにしている。また、(PB1)9を引く時の節度は裏押サエ40により行なわれている。

【0018】前記一連の操作の中で(PB1)9を引くことで(PB1)9と一体になっている巻真31が引かれ、地板18に植設された支柱32を回転軸としてオシドリ33が回転し、該オシドリ33の端部33aが反時計方向に回転し回転規制部材30の端部30bを押す。すると、地板18に植設された支柱35を回転軸とする回転規制部材30の回転規制部30aは反時計方向に回転し、回転規制部30aは図示位置より左側にずれる。左側にずれることで月及び日の各ステップモーター14、23は規制が解かれてフリーになるので、逆転するために必要な次の安定点に吸引されない程度にローターを正転方向に回転させることが出来、逆回転可能となる。

【0019】

【考案の効果】以上の説明で明らかなように本考案によれば、ローターが逆回転不可能状態に陥った時以外には、回転規制用凸部が回転規制部材に触れることもないので、指針の位置に影響を与えることもない修正機構を提供でき、しかも、輪列部品を直接押すこともないので、輪列部品に傷を付けることも無い。

【0020】また、本考案の実施例のような同軸に二針を設け扇形表示する時計でも簡単な構成で逆回転不可能状態からの脱出を可能にすることが出来る効果がある。

【図面の簡単な説明】

【図1】本考案の実施例による指針扇形表示輪列の修正機構を示す要部平面図である。

【図2】本考案の実施例を用いた時計の外観図である。

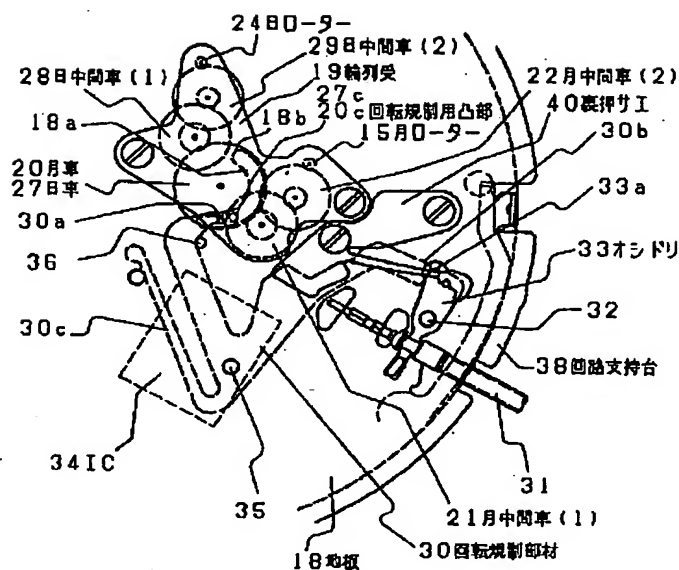
【図3】本考案の実施例による指針扇形表示輪列の断面図である。

【符号の説明】

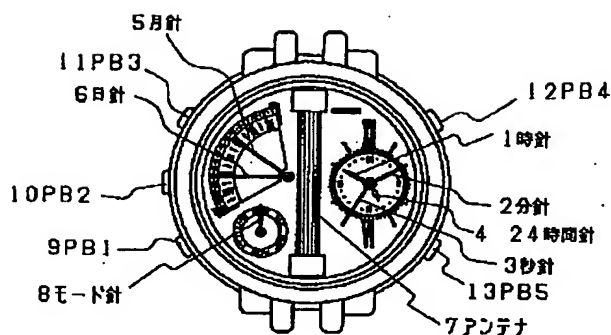
- 5 月針
- 6 日針
- 9 プッシュプルボタン (PB1)
- 15 月ローター
- 18 地板
- 19 輪列受
- 20 月車
- 20c, 27c 回転規制用凸部
- 24 日ローター
- 27 日車
- 30 回転規制部材
- 30a 回転規制部
- 33 オシドリ

(4)

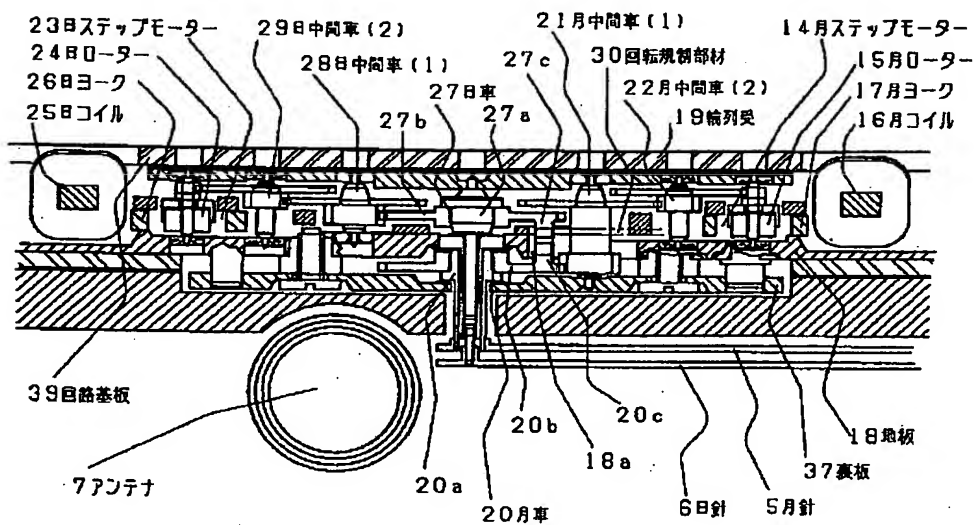
【図1】



【図2】



【図3】



フロントページの続き

(58)調査した分野(Int. Cl. 6, DB名)

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CLAIMS

(57) [Utility model registration claim]

[Claim 1] In the guide sector display type electronic clock which has the reduction train which tells rotation of the rotor which drives a guide vehicle and a guide vehicle to carry out forward inverse rotation of the step motor, and for a guide perform a sector display, and a rotor to a guide vehicle While the specification-part-ed material prepared into the reduction train between said rotors from said guide vehicle and an external operating member are interlocked with Have the rotation specification-part material which regulates actuation of said specification-part-ed material, and when said rotor is disabling of operation in contact with said rotation specification-part material, said specification-part-ed material The correction device of the sector display wheel train characterized by constituting said rotor from an inverse rotation impossible condition possible [escape] by shifting to the direction side of said specification-part-ed material which follows said rotation specification-part material on forward rotation actuation of said rotor by actuation of said external operating member of operation.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed explanation of a design]

[0001]

[Industrial Application] This design is related with the wheel train correction device for extricating the step motor of a guide sector display clock from an inverse rotation impossible condition.

[0002]

[Description of the Prior Art] In recent years, according to commercial-scene needs with a many-sided electronic clock, a variety of goods have begun to appear, from the first, also in a guide display type clock, the demand of diversification of a clock of a digital clock is strong, and what [its] added the chronograph, the multi-needle display type calender, and the age-of-the-moon display is in a commercial scene as ****. Furthermore, as an electronic clock of a new design, forward inverse rotation of the step motor was carried out, and the electronic clock which is made to carry out a sector drive and displays **** has also appeared.

[0003] By the way, in the case of an electronic clock, a special pulse is impressed in order to carry out the inverse rotation drive of the step motor. That is, in order to carry out 1 pulse inverse rotation, after impressing the pulse for normal rotation to the beginning and shaking a rotor at a normal rotation side, it is constituted so that the pulse for an inversion may be impressed. And when it is going to indicate by the sector using the forward inverse rotation of a step motor, the stopper is surely formed in the middle of the rotation member. Therefore, driving certainly is indispensable even when correcting **, and it bumps into this stopper. However, when it dashes against a stopper and a rotor is stopped, depending on the halt location of a rotor, a stopper may prevent rotation of the normal rotation direction of a rotor, and may lapse into an inverse rotation impossible condition.

[0004] It is related with the wheel train correction device of the sector display electronic clock of such said **. In order to extricate a step motor from an inverse rotation impossible condition according to JP,3-8789,U for which these people apply The member for rotation is prepared in either of the reduction trains from the rotor of a step motor to the guide vehicle of a sector display. A step motor pushes the member for rotation on inverse rotation from normal rotation in the direction which makes a rotation change at the correction member interlocked with an external operating member, and it is made to escape from an inverse rotation impossible condition, and enables it to rotate.

[0005]

[Problem(s) to be Solved by the Device] However, according to the conventional example described above, in order to extricate a step motor from an inverse rotation impossible condition, a correction member must be moved in the direction as for which a step motor carries out inverse rotation. That is, since the member for rotation must move a correction member to the side which is operating normally, there is possibility that a correction member will go into normal actuation within the limits of the member for rotation. Therefore, even while the guide is carrying out normal actuation, when an external operating member is pushed, there is a possibility of moving a guide. In an electronic clock which prepares two stitches in the same axle and indicates by the sector especially, it becomes the complicated structure of needing two correction

members, by the approach of rotating by the correction member.

[0006] The purpose of this design offers the easy correction device in which the location of a guide is not affected, except actuation of extricating a step motor from an inverse rotation impossible condition.

[0007]

[Means for Solving the Problem] In order to make the above-mentioned purpose attain, this design is taken as the following configurations. Namely, the correction device of the sector display wheel train concerning this design

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[0004] It is related with the wheel train correction device of the sector display electronic clock of such said **. In order to extricate a step motor from an inverse rotation impossible condition according to JP.3-8789,U for which these people apply The member for rotation is prepared in either of the reduction trains from the rotor of a step motor to the guide vehicle of a sector display. A step motor pushes the member for rotation on inverse rotation from normal rotation in the direction which makes a rotation change at the correction member interlocked with an external operating member, and it is made to escape from an inverse rotation impossible condition, and enables it to rotate.

[0005]

[Problem(s) to be Solved by the Device] However, according to the conventional example described above, in order to extricate a step motor from an inverse rotation impossible condition, a correction member must be moved in the direction as for which a step motor carries out inverse rotation. That is, since the member for rotation must move a correction member to the side which is operating normally, there is possibility that a correction member will go into normal actuation within the limits of the member for rotation. Therefore, even while the guide is carrying out normal actuation, when an external operating member is pushed, there is a possibility of moving a guide. In an electronic clock which prepares two stitches in the same axle and indicates by the sector especially, it becomes the complicated structure of needing two correction

members, by the approach of rotating by the correction member.

[0006] The purpose of this design offers the easy correction device in which the location of a guide is not affected, except actuation of extricating a step motor from an inverse rotation impossible condition.

[0007]

[Means for Solving the Problem] In order to make the above-mentioned purpose attain, this design is taken as the following configurations. Namely, the correction device of the sector display wheel train concerning this design To some reduction trains which intervene between the guide vehicle in which a guide is attached, and a step motor and said guide vehicle The heights for rotation regulation which give regulation of a drive of said step motor are prepared. It has the rotation specification-part material which carries out rotation regulation of said step motor when said step motor continues driving by forward rotation. Furthermore, this rotation specification-part material It rotates to the side which is interlocked with an external operating member and a step motor rotates normally by external actuation, and is made to make a rotation change of the step motor in the inversion direction from normal rotation.

[0008]

[Function] According to the above configuration, while the guide vehicle is operating normally, even if it operates it by the external operating member, there is no effect of any in a guide vehicle, and the location of a guide is not changed.

[0009]

[Example] The example of this design is explained based on a drawing below. The external view of the clock with which drawing 2 is the clock which applied this example, for example, an electric wave can be received and time of day can be doubled which drawing 1 is the important section top view showing the guide sector display wheel train correction device by the example of this design, and is seen from a back lid side, and drawing 3 are the sectional views of a guide sector display wheel train.

[0010] In drawing 2, it is the hour hand which 1 rotates one time in 12 hours, the minute hand which 2 rotates one time in 60 minutes, the second hand which 3 rotates one time in 60 seconds by movement for 1 second, and the 24-hour needle which 4 rotates one time in 24 hours, and each of these usually displays time of day, and drives it through a guide wheel train with a step motor (not shown).

[0011] Furthermore, the calender is indicated by the sector with **** 5 and the Japanese needle 6. After carrying out 72 step stepping of this **** 5 counterclockwise by movement in 6 steps / January by electric control from IC, it performs both-way movement which returns to a clock hand of cut by 72 steps (a part for December) with a rapid traverse of a moon step motor. Moreover, after carrying out 62 step stepping also of the Japanese needle 6 counterclockwise by movement on 2 steps / 1st by electric control from IC, both-way movement which returns to a clock hand of cut by 62 steps (part on the 31st) with a rapid traverse of a Japanese step motor is performed. In addition, since **** 5 and the Japanese needle 6 will lap with the antenna 7 for receiving an arrangement **** electric wave on the top face of a dial, or the mode needle 8 superficially if it is made to all rotate, they need rotation regulation.

[0012] 8 is a mode needle, in order that 9 may change the mode or may correct time of day, it is a push pull carbon button for sending the signal of shifting to a correction condition to IC (it omits the following PB1), and 10, 11, 12, and 13 are push buttons 2, 3, 4, and 5 (it omits the following with each PB2, PB3, PB4, and PB5), and it has the member which is alike, respectively and sends an electrical signal to IC (not shown).

[0013] Next, drawing 1 and drawing 3 explain the sector display wheel train device and correction device of **** 5 and the Japanese needle 6. First, a wheel train device is explained. The moon step motor which 14 makes carry out the fan display drive of **** 5 by the electric control from IC34, the moon rotor from which 15 constitutes the moon step motor 14 with the moon coil 16 and moon York 17, and this moon rotor 15 are supported to revolve with the cope plate 18 which is a clock pedestal, and the precious stone fixed to the wheel train carrier 19. Moreover, laminating arrangement of moon York 17 and the moon coil 16 is carried out at the top-face side of a cope plate 18. Driving force is transmitted from the moon rotor 15 through moon middle

vehicle (1) 21 whose **** 20 which attaches **** 5 is a reduction train, and (2) 22. This moon middle vehicle (1) 21 is supported to revolve with backing 37 and the precious stone fixed to the wheel train carrier 19, and moon middle vehicle (2) 22 are supported to revolve like the moon rotor 15 with the cope plate 18 and the precious stone fixed to the wheel train carrier 19. **** 20 consists of ***** 20a which attaches **** 5, and moon gearing 20b which consists of the synthetic resin which receives turning effort, it laps with variant slot 18a which ended in the cope plate 18 in cross section at moon gearing 20b, and heights 20c for rotation regulation which becomes a stopper when carrying out rotation regulation of **** 20 is really fabricated.

[0014] the configuration as the wheel train device by the side of **** 5 also with the same wheel train device by the side of the Japanese needle 6 -- accomplishing -- **** -- 23 -- a Japanese step motor and 24 -- for a Japanese coil and 26, Japanese York and 27 are [a Japanese rotor and 25 / Japanese **** and 27b of 27a] the Japan Dental Association vehicles by the Japanese vehicle. Moreover, 28 is an idler pulley (1), 29 is an idler pulley (2) in the daytime, and heights 27c for rotation regulation is really fabricated by Japan Dental Association vehicle 27b like moon gearing 20b.

[0015] Heights 20c for rotation regulation of moon gearing 20b and heights 27c for rotation regulation of the Japan Dental Association vehicle 27 reciprocate the inside of variant slot 18a of a cope plate 18 by alignment actuation with IC34 performed immediately after a cell injection, without contacting other components.

[0016] Moreover, the rotation specification-part material 30 is arranged in the location which does not lap with a wheel train superficially on the top face of a cope plate 18. Rotation regulation by the side of normal rotation of a step motor is performed by applying the heights 20c and 27c for rotation regulation of moon gearing 20b and Japan Dental Association vehicle 27b to rotation specification-part 30a of this rotation specification-part material 30. At this time, superficial location regulation of the rotation specification-part material 30 is performed by the reaction force of spring section 30c of the stanchion 36 implanted in the cope plate 18, and the rotation specification-part material 30. Normal rotation of the step motor in the case of this example is that the moon rotor 15 and the Japanese rotor 24 rotate counterclockwise. On the other hand, rotation regulation by the side of the inverse rotation of a step motor is performed by applying the heights 20c and 27c for rotation regulation of moon gearing 20b and Japan Dental Association vehicle 27b to the edge 18b side of 18a of the variant slot of a cope plate. Therefore, **** 5 and the Japanese needle 6 do not hit an antenna 7, even if IC34 overruns recklessly. Moreover, the circuit susceptor 38 made with the synthetic resin which has prepared the clearance which needs the cross-section relation between IC34 and the rotation specification-part material 30 in order that the rotation specification-part material 30 may be arranged on the top face of a cope plate 18 and this rotation specification-part material 30 may slide on it is arranged, and IC34 further mounted in the upper part on the inferior surface of tongue of the circuit board 39 is arranged.

[0017] Next, actuation of a correction device is explained. IC overruns recklessly, a step motor rotates normally continuously, and heights 20for rotation regulation c or 27c of **** 20 and the Japanese vehicle 27 collides with rotation specification-part 30a of rotation specification-part material, stops, and suppose that it changed into the inverse rotation impossible condition. Thus, because IC34 is not operating normally, since it will be in an inverse rotation impossible condition, this clock subtracts 9 (PB1) (PB2), and he is trying to push 10, 11 (PB3), 12 (PB4), and 13 (PB5) on coincidence as the actuation which needs to initialize IC34. He carries out inverse rotation of the moon rotor 15 and the Japanese rotor 24 with the electrical signal from IC34 by this actuation, and is trying to make an initial valve position drive. Moreover, the moderation when subtracting 9 (PB1) is performed by back ** SAE 40.

[0018] **** 31 which is united with 9 (PB1) by subtracting nine (PB1) in actuation of said single string is lengthened, a mandarin duck 33 rotates by setting a revolving shaft as the stanchion 32 implanted in the cope plate 18, and edge 33a of this mandarin duck 33 rotates counterclockwise, and pushes edge 30b of the rotation specification-part material 30. Then, rotation specification-part 30a of the rotation specification-part material 30 used as a revolving shaft rotates counterclockwise the stanchion 35 implanted in the cope plate 18, and rotation specification-

part 30a shifts on the left of an illustration location. Since regulation is solved and each step motors 14 and 23 of the moon and a day become free by shifting to left-hand side, extent which is not attracted by the following stabilized point required in order to reverse can be made to rotate a rotor in the normal rotation direction, and inverse rotation becomes possible.

[0019]

[Effect of the Device] Since the correction device in which the location of a guide is not affected since the heights for rotation regulation do not touch rotation specification-part material except when a rotor lapses into an inverse rotation impossible condition according to this design can be offered and wheel train components moreover are not pushed directly, a blemish is not attached to wheel train components so that clearly [in the above explanation].

[0020] Moreover, there is effectiveness which can enable escape from an inverse rotation impossible condition with an easy configuration also by the clock which prepares two stitches in the same axle like the example of this design, and indicates by the sector.

[Translation done.]